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(54) **PROCESS FOR HIGH-YIELD PRODUCTION OF GRAPHENE VIA DETONATION OF CARBON-CONTAINING MATERIAL**

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See application file for complete search history.

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(57) **ABSTRACT**

A method of producing pristine graphene particles through a one-step, gas-phase, catalyst-free detonation of a mixture of one or more carbon-containing compounds hydrocarbon compounds and one or more oxidizing agents is provided. The detonation reaction occurs very quickly and at relatively high temperature, greater than 3000 K, to generate graphene nanosheets that can be recovered from the reaction vessel, such as in the form of an aerosol. The graphene nanosheets may be stacked in single, double, or triple layers, for example, and may have an average particle size of between about 35 to about 250 nm.

31 Claims, 10 Drawing Sheets